CHEMICAL RECOVERY

Chemical recovery methods include polymer, micellar-polymer and alkaline flooding.

Polymer flooding is used under certain reservoir conditions that lower the efficiency of a regular waterflood, such as fractures or high-permeability regions that channel or redirect the flow of injected water, or heavy oil that is resistant to flow. Adding a water-soluble polymer to the waterflood allows the water to move through more of the reservoir rock, resulting in a larger percentage of oil recovery. Polymer gel is also used to shut off high-permeability zones.

Micellar-polymer flooding uses the injection of a micellar slug containing a mixture of a surfactant, cosurfactant, alcohol, brine, and oil that moves through the oil-bearing formation, releasing much of the oil trapped in the rock. This method is one of the most efficient EOR methods, but is also one of the most costly to implement.

Alkaline flooding requires the injection of alkaline chemicals (lye or caustic solutions) into a reservoir that react with petroleum acids to form surfactants that help release the oil from the rock by reducing interfacial tension, changing the rock surface wettability, or spontaneous emulsification. The oil can then be more easily moved through the reservoir to production wells. A new modification to the process is the addition of surfactant and polymer to the alkali, giving rise to an alkaline-surfactant-polymer (ASP) EOR method, essentially a less costly form of micellar-polymer flooding.

CHEMICAL RECOVERY

Recovery methods in this category may include surfactant, polymer and alkaline flooding. A reservoir is usually conditioned by a water preflush, then specific chemicals are injected to reduce interfacial tension (help release oil), and/or improve mobility control (reduce channeling and/or viscous fingering). This action is followed by injecting a driving fluid (water) to move the chemicals and resulting oil bank to production wells.